

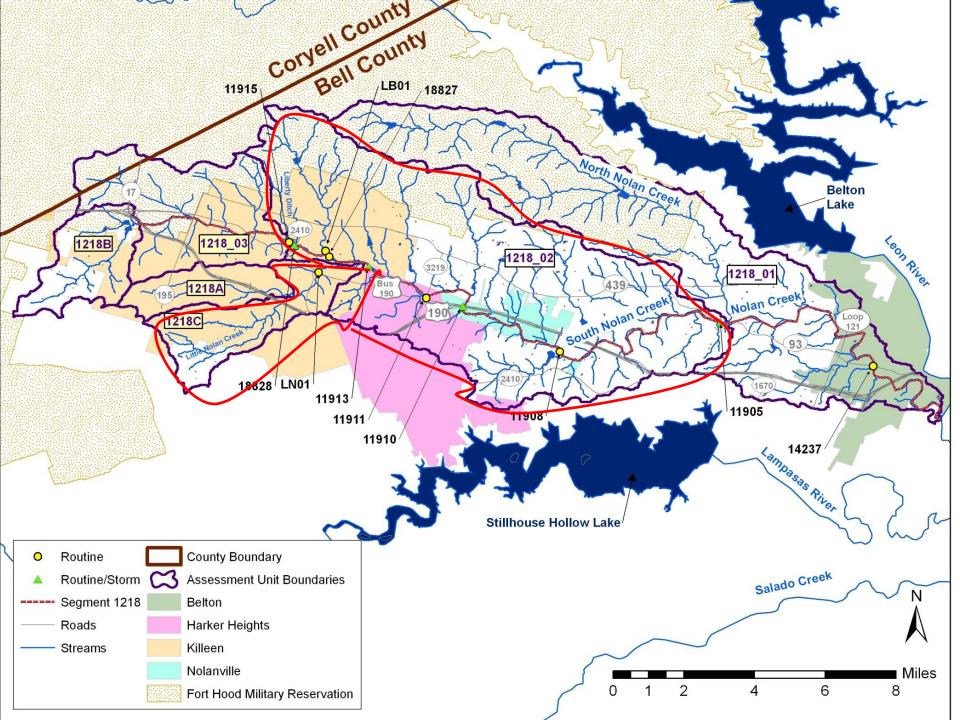
**Project Update** 

**September 25, 2014** 

# Segment 1218 303(d) List

Impaired due to elevated bacteria in two Assessment Units (AUs)

- 1218\_02 South Nolan from Liberty Ditch to confluence with North Nolan/Nolan Creek
- 1218C\_01 Little Nolan Creek



# **Project Goal**

### **Identify potential sources**

- Monitoring program
- Source Survey
- Geographic inventory & modeling

## **Monitoring Program**

### **Monthly Routine**

11 Stations

### **Quarterly Storm**

4 Stations

**Presenting Preliminary Data -**

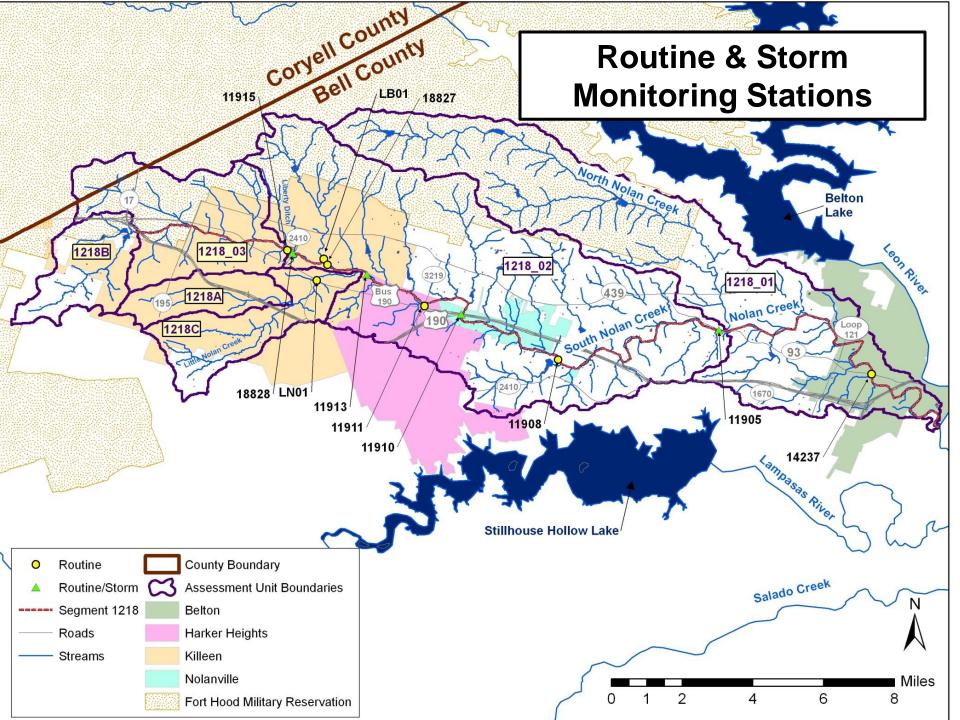
May 2013 through August 2014

Routine (16 events) & Storm (5 events)

# **Stream Team Monitoring**

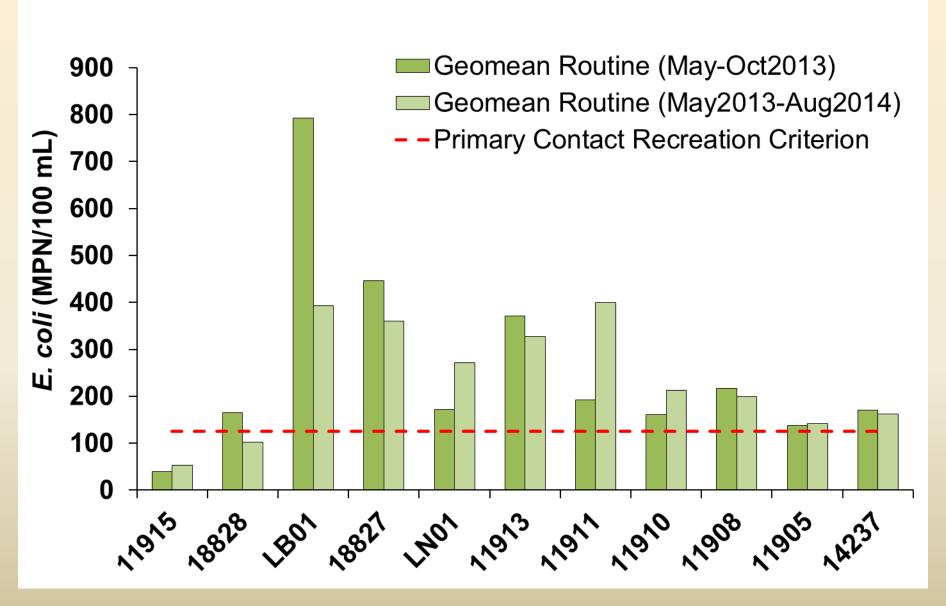


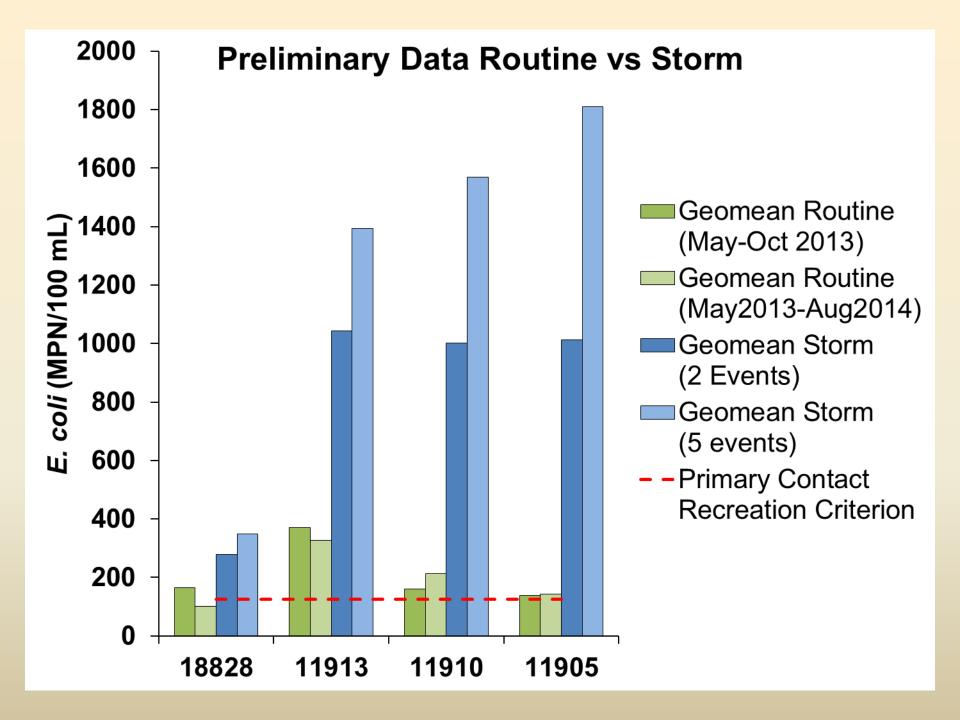
http://txstreamteam.meadowscenter.txstate.edu/data/data-viewer.html

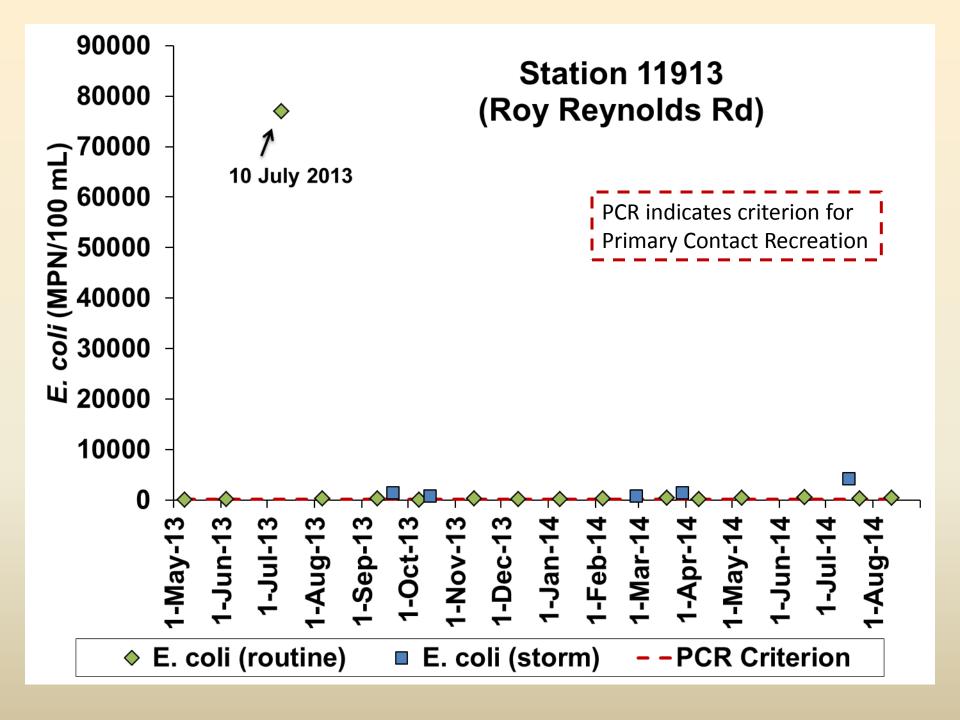


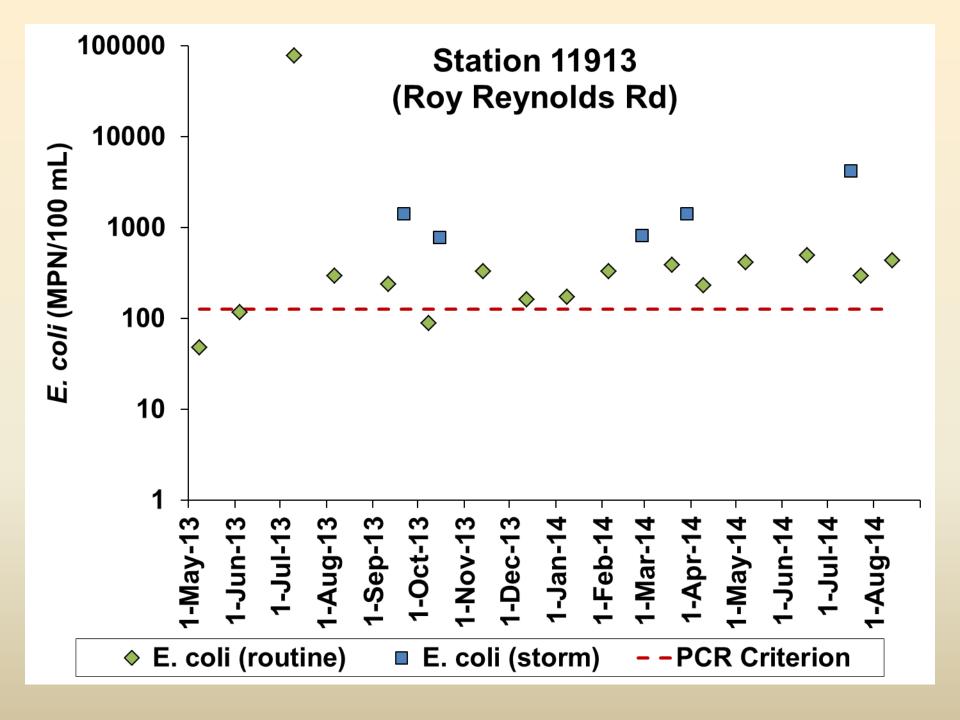
#### **Preliminary Routine Data**

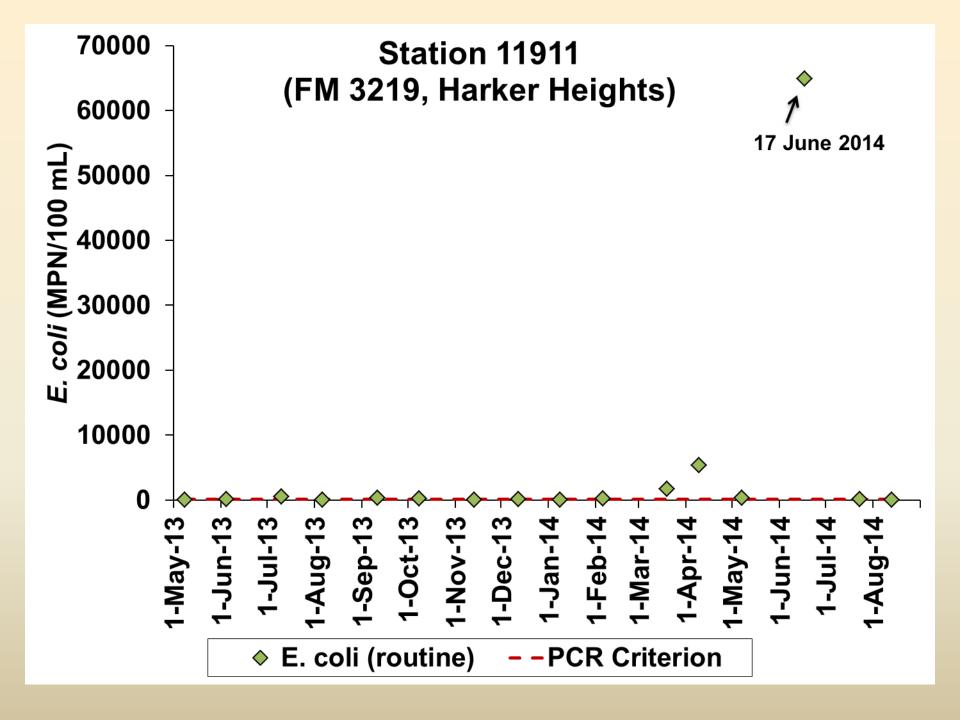
(6 vs 16 Monthly Events)

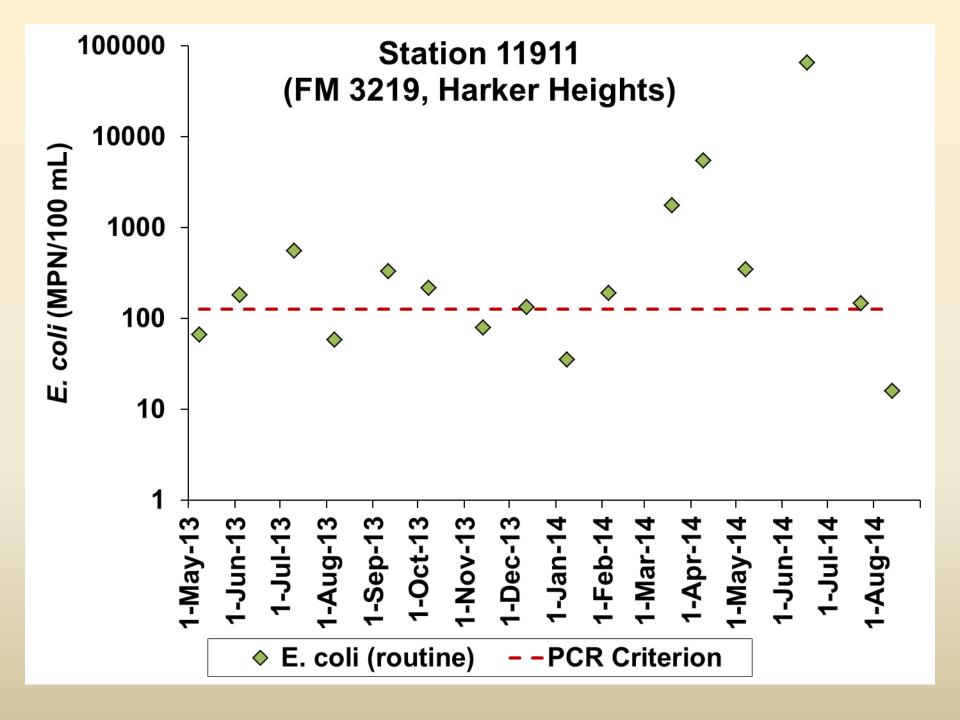


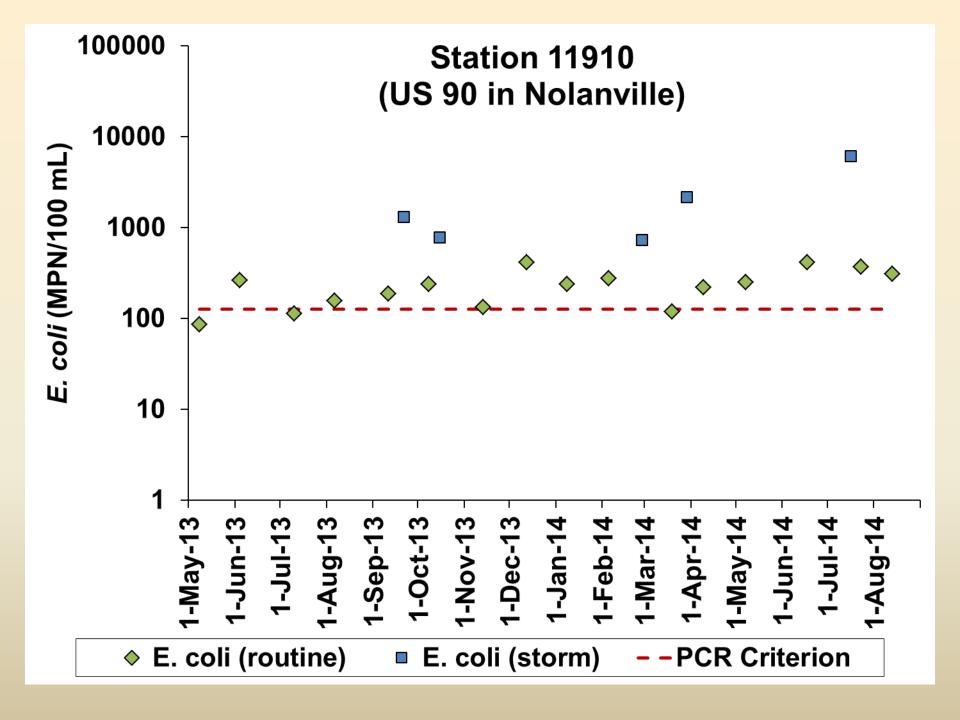


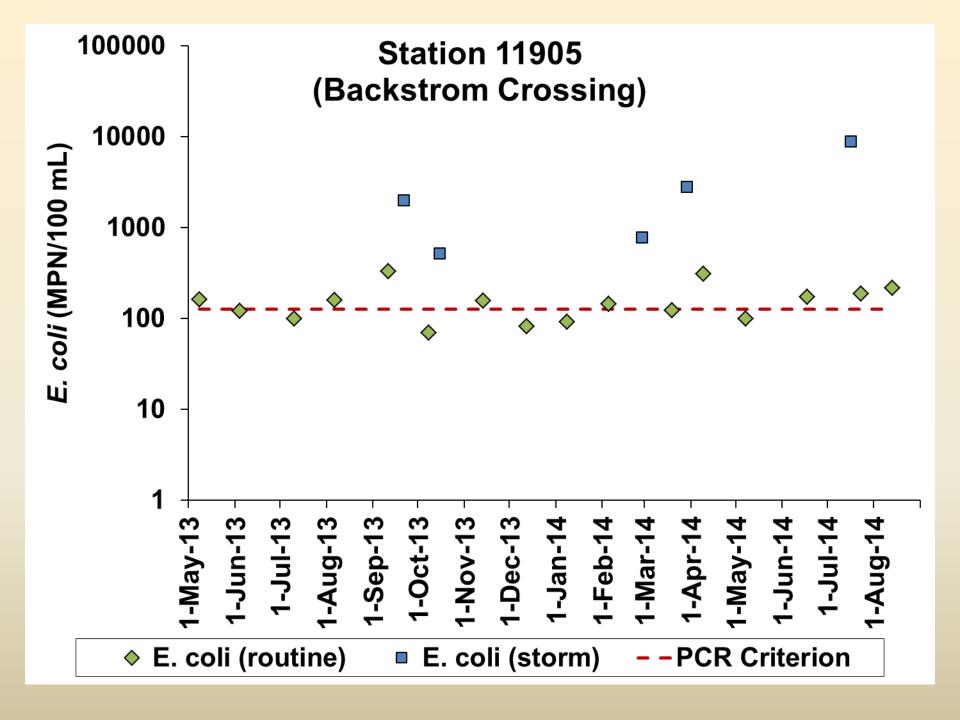


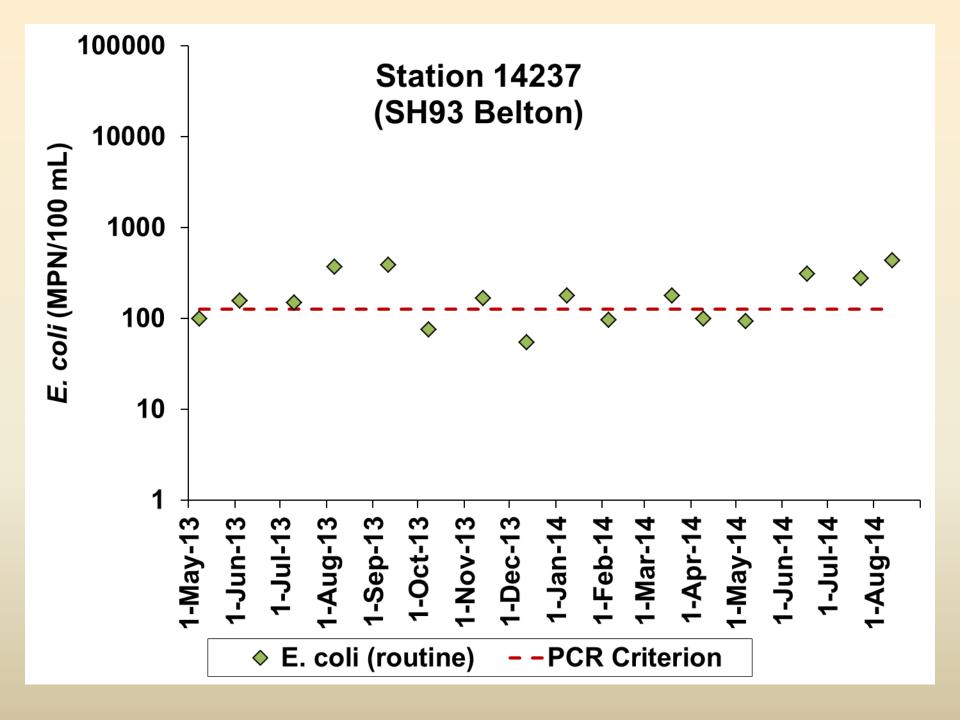












## How can we decrease bacteria?

### First need to Identify Sources

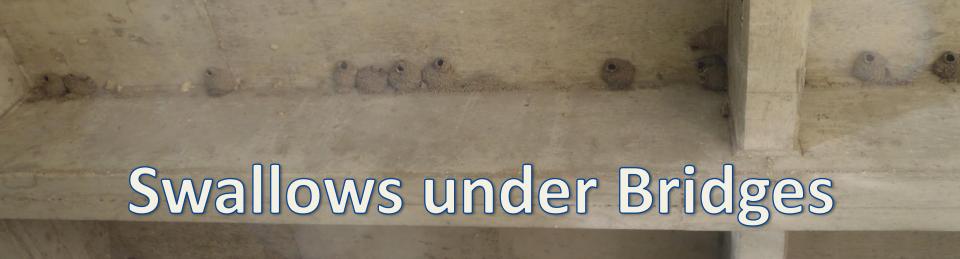
- Monitoring program
- Source Survey
- Geographic inventory & modeling

# **Source Survey**

### **Visual Assessment**

- Streambank erosion
- Pipe outfalls
- Livestock (near or with stream access)
- Wildlife (e.g., swallows on bridges or large populations of waterfowl)







#### Sources

# Municipal Storm Water Sanitary Sewer Overflows (SSOs) Reported by municipalities to TCEQ

# Sources ?? Local Knowledge Needed to Identify



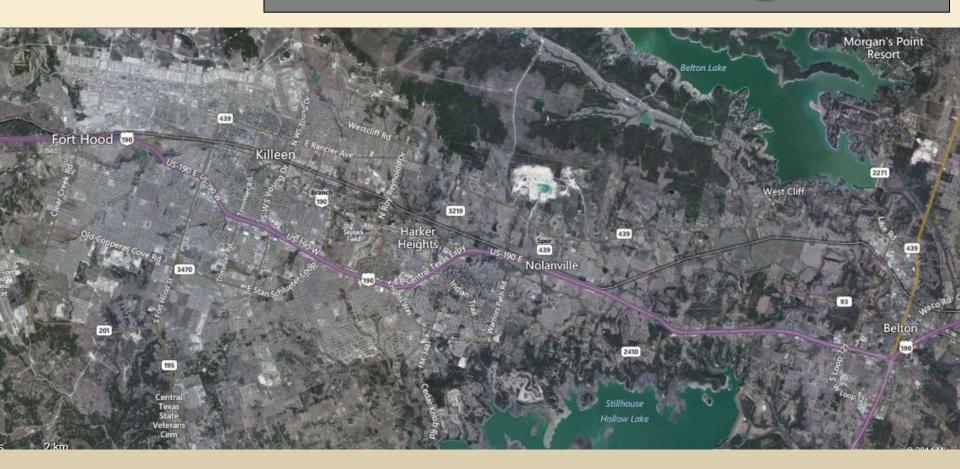


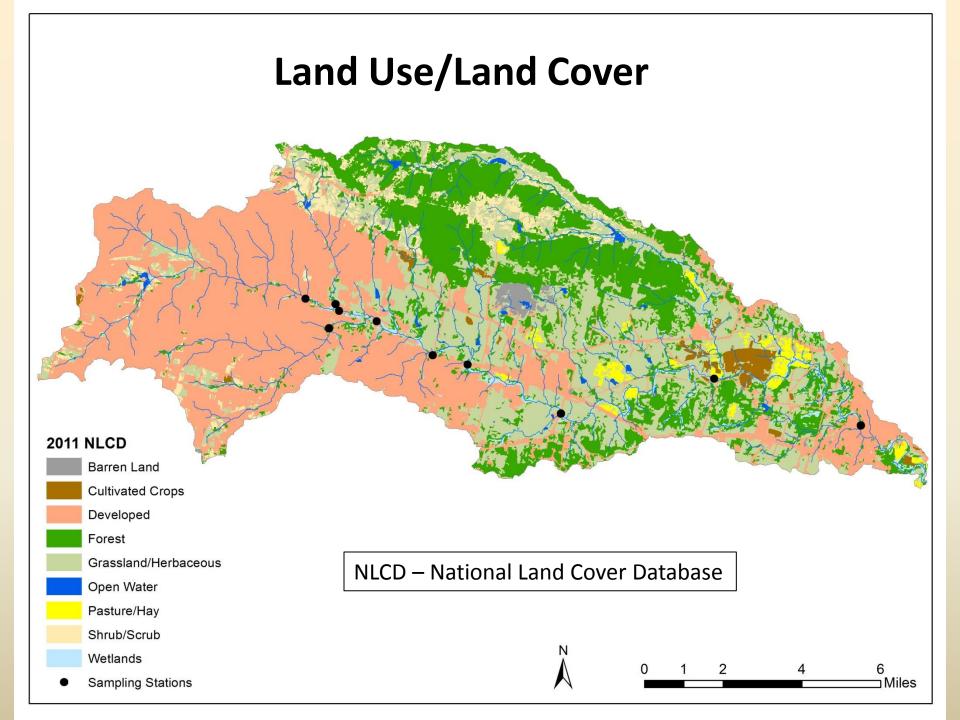


### Sources

# On-Site Sewage Facilities (Septic Systems) Failure Rate ??

# Geographic Inventory & Modeling





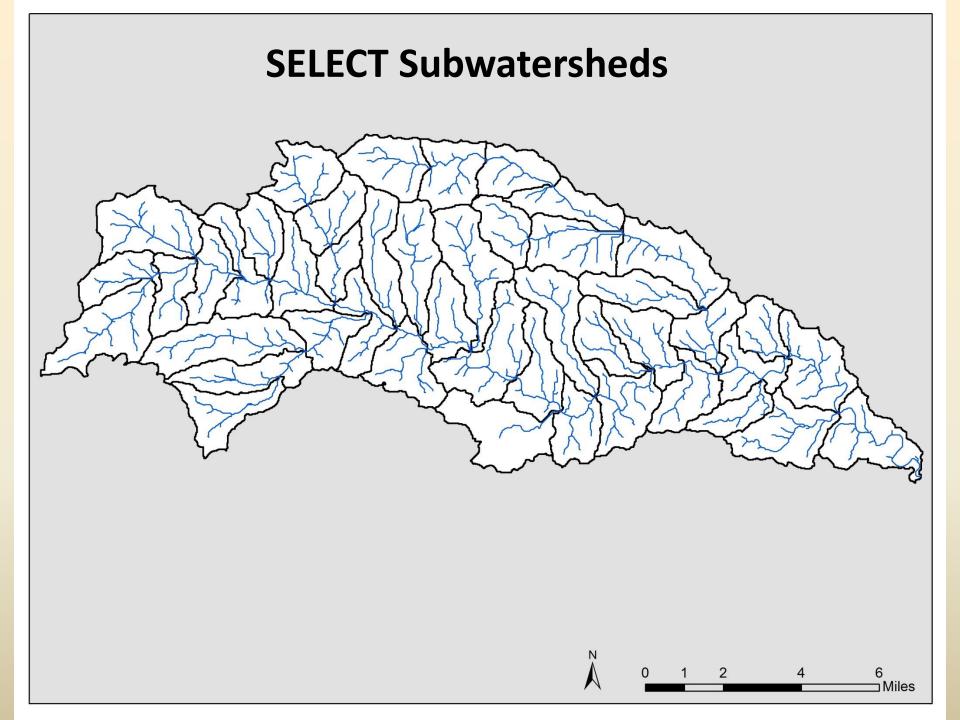
# Modeling to Identify Potential Bacteria Sources

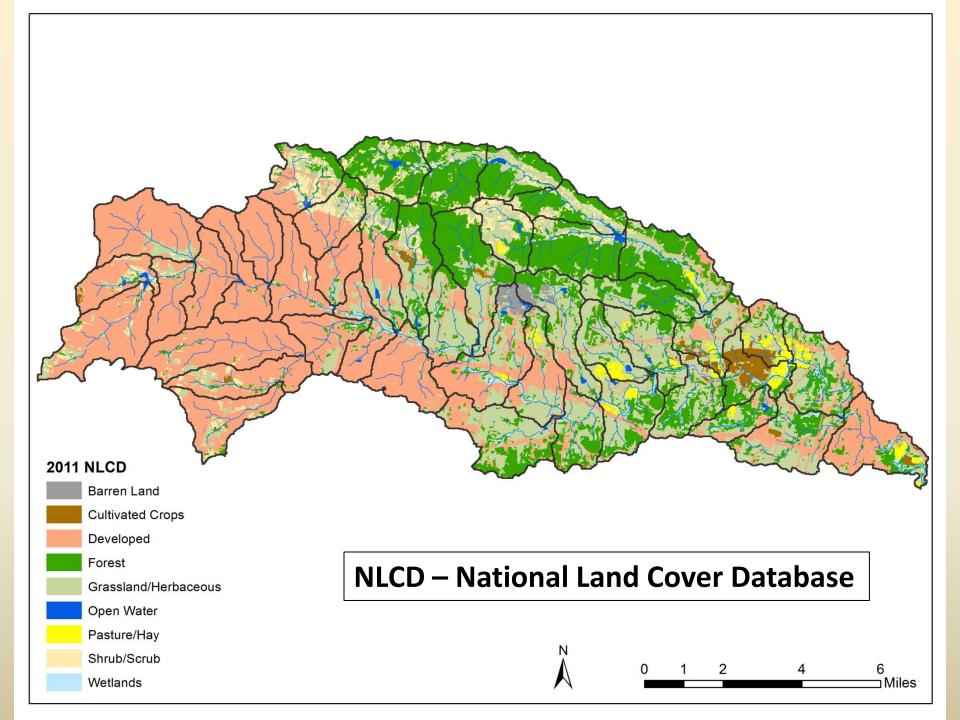
# SELECT (Spatially Explicit Load Enrichment Calculation Tool)

Developed by Dept. of Biological and Agricultural Engineering and Spatial Sciences Laboratory at Texas A&M University by Dr. R. Karthikeyan, Dr. R. Srinivasan and others

### **SELECT**

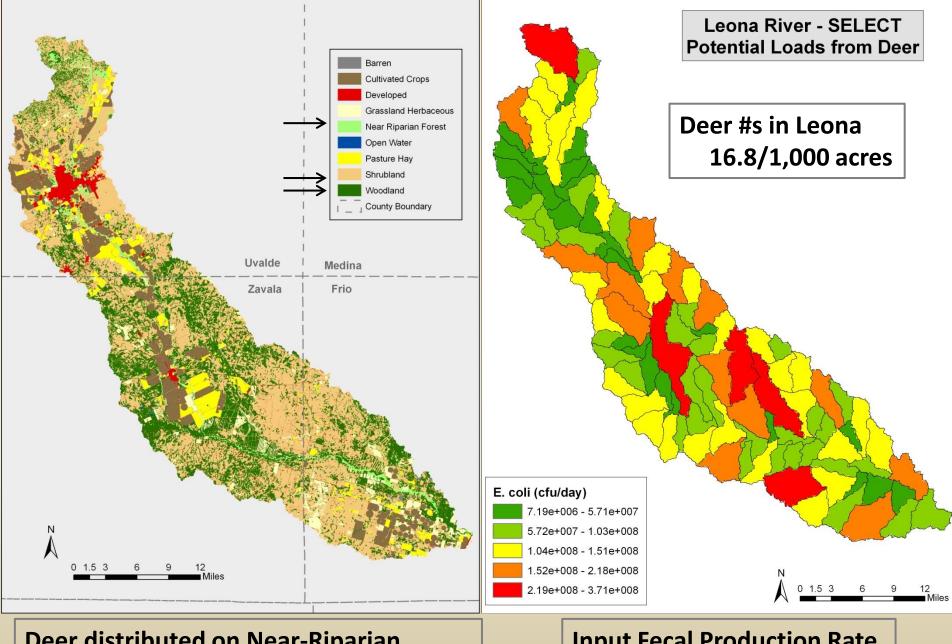
- Identifies <u>POTENTIAL</u> bacteria loadings by subwatershed
- Based on spatial data, such as:
  - Land use
  - Soils
  - Stream network
  - Animal density
  - Human population information





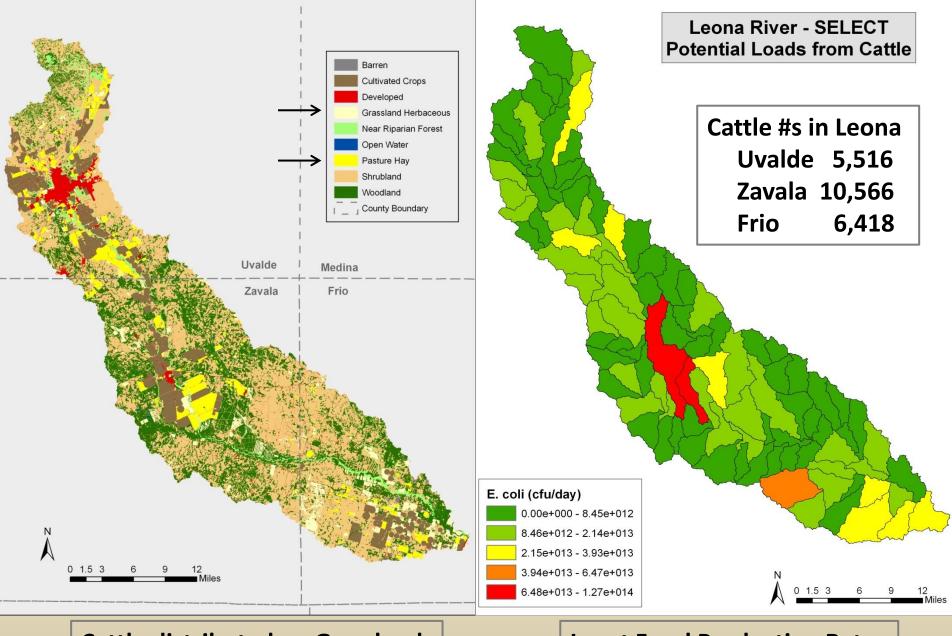
# **SELECT Example**

**Leona Watershed in southwest Texas** 



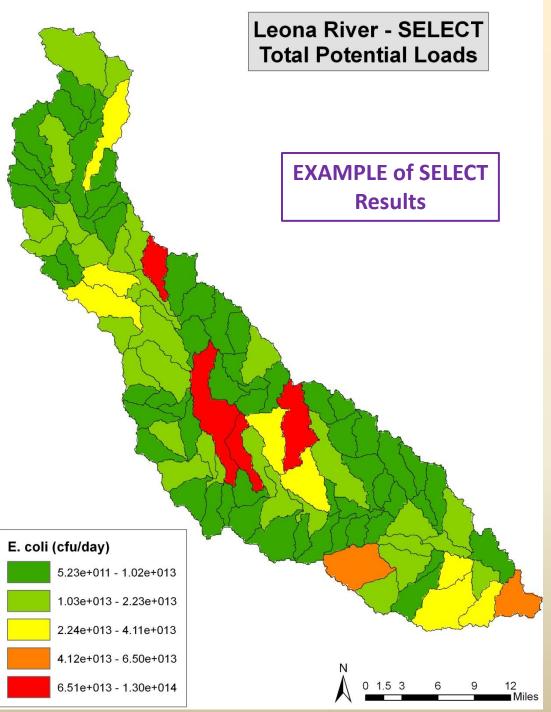
Deer distributed on Near-Riparian Forest, Shrubland & Woodland

Input Fecal Production Rate Deer 3.5E8 cfu/animal/day



Cattle distributed on Grassland Herbaceous and Pasture/Hay

Input Fecal Production Rate Cattle 10E10 cfu/animal/day



### **SELECT**

- Indicates potential loadings based on a "worst case" scenario
- Highlights "hot spots" to consider for control efforts
- Stakeholder feedback needed to scrutinize inputs and results

- Population & Household Densities -2010 Census data, used in determining
  - Domestic Animal Density

American Veterinary Medical Association estimates 0.6 dogs/household

Does this make sense for the Nolan Creek watershed?

- Population & Household Densities used in determining
  - Areas on septic systems indicated as outside CCNs

Certificate of Convenience and Necessity (CCN) is issued by TCEQ and authorizes a utility to provide water and/or sewer service to a specific area.

Is this an appropriate representation?

- Permitted Discharges (TCEQ & EPA records)
  - Wastewater treatment facilities
  - Industrial
  - Concentrated Animal Feeding Operations (CAFOs)

- Livestock Densities
  - Agricultural Statistics (USDA) County
     level data
  - Stakeholder input
- Wildlife (native & exotic)
  - Resource Experts (Texas Parks & Wildlife)
  - Stakeholder input

- Feral Hogs
  - Resource Experts (Texas Parks & Wildlife, AgriLife Extension)
  - Stakeholder input

How large is the feral hog problem in the Nolan Creek watershed?

### Sources not included

### **SELECT** does not yet handle

- Exotics
- Small wildlife (birds, raccoons, possums, etc.)

### How can we decrease bacteria?

- ✓ Identify potential sources
  - Monitoring program
  - Source Survey
  - Geographic inventory & modeling

## **Next Steps**

- ✓ Determine load reductions needed to meet standards
- ✓ Inventory existing programs and practices and their effectiveness

## **Next Steps**

- ✓ Identify new management opportunities targeting critical areas
- ✓ Develop educational outreach program to encourage voluntary implementation

### **Contact Information**

**Leah Taylor** 

Email: <a href="mailto:ltaylor@tiaer.tarleton.edu">ltaylor@tiaer.tarleton.edu</a>

Office Phone: 254.968.0513

**Anne McFarland** 

Email: mcfarla@tiaer.tarleton.edu

Office Phone: 254.968.9581

http://www.killeentexas.gov/nolancreekwatershed

